

REMARKS

Claims 1-18 are pending in the application. Claims 16-18 have been withdrawn.

Claims 1-15 are rejected. These rejections are respectfully traversed.

Claims 1, 3, 10, 12, and 13 have been amended. No new matter is added.

Applicant requests reconsideration and allowance of the claims in light of the above amendments and following remarks.

Objection to the Specification

The Office Action (“Action”) objects to the Specification because of the following informalities: at lines 17-18 on page 6 of the Specification, the numeral “10” is used to designate both a reactant feeder and an inlet.

With entry of this Amendment, the pertinent lines in the Specification are amended to state “inlet 21” rather than “inlet 10.”

Accordingly, the objection to the Specification should be removed.

Patentability of Claims 10 and 13 under 35 U.S.C. § 112

The Action rejects claims 10 and 13 under 35 U.S.C. § 112 as being indefinite. These rejections are respectfully traversed.

Claims 10 and 13 have each been amended to recite “wherein said screw comprises a thread and a groove.”

Accordingly, the 35 U.S.C. § 112 rejections of claims 10 and 13 should be withdrawn.

Patentability of Claims 1, 2, 4, 7, 9, 10, and 14 over GB ‘781 under 35 U.S.C. § 102(b)

Claims 1, 2, 4, 7, 9, 10, and 14 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.K. Patent Application GB 2,324,781 (referred to as “GB ‘781” hereinafter). These rejections are respectfully traversed.

In order for a single prior art reference anticipate a claim, the reference must teach each and every element recited in the claim (*see* M.P.E.P. § 2131). Applicant submits that GB ‘781 does not teach each and every element of any of claims 1, 2, 4, 7, 9, 10, and 14.

Independent claim 1 is directed to a powder fabricating apparatus, and recites the following (with emphasis added):

a barrel wherein an inlet and an outlet are formed at both opposite ends thereof, respectively;

a screw which is rotationally mounted in the barrel and by which reactant supplied from the inlet moves toward the outlet;

a driving portion for causing a relative rotational motion between the screw and the barrel;

a reaction control means for controlling reaction conditions of the reactant which moves in the barrel to induce a chemical reaction of the reactant; and

a controller for controlling the driving portion and the reaction control means.

The Action relies on various passages in GB '781 for its rejection of independent claim 1. Applicant submits, however, that none of the cited passages nor any other passage in GB '781 teach each and every element recited in independent claim 1.

For example, GB '781 does not teach at least "a reaction control means for controlling reaction conditions of the reactant which moves in the barrel *to induce a chemical reaction of the reactant.*" Rather, GB '781 describes at page 5, last paragraph, to page 6, last paragraph (as noted in the Action) a temperature control means 20 that is configured to enhance a physical reaction such as mixing the reactant, which has a distinct technical purpose and effect from the recited chemical reaction.

More specifically, a physical reaction typically represents a process in which phase, structure, concentration, pressure, and so forth are changed without any change of an intrinsic property of the original molecule, ion, or nucleus. Examples of a physical reaction include stirring, pulverizing, crushing, *mixing, heating, cooling*, sieving, distillation, and evaporation. Thus, the temperature control means 20 of GB '781 is directed to physical reactions only and not to chemical reactions. For example, GB '781 states at page 6, last paragraph, that "hotter and colder volumes are mixed so that a more even temperature throughout the powder volume is achieved" and also that "the temperature is controlled zonally along the conveying means" so as "to preserve the temperature of the moulding material as it is conveyed."

In contrast, a chemical reaction, such as that induced by the recited reaction control means, typically represents a process in which an intrinsic property of the original material is changed into a different form. Examples of a chemical reaction include redox (reduction/oxidation), combustion, nuclear fission, nuclear fusion, and metabolism.

Therefore, because GB '781 does not teach each and every element recited in independent claim 1, the 35 U.S.C. § 102(b) rejection of independent claim 1 should be withdrawn.

Dependent claims 2, 4, 7, 9, 10, and 14 depend directly or indirectly from independent claim 1 and are allowable for at least the reasons presented above with respect to the parent claim 1. Dependent claims 2, 4, 7, 9, 10, and 14 are also independently patentable.

Accordingly, Applicant submits that the 35 U.S.C. § 102(b) rejections of dependent claims 2, 4, 7, 9, 10, and 14 should be withdrawn.

Patentability of Claims 1, 2, 4-8, and 10-14 over Shutov under 35 U.S.C. § 102(b)

Claims 1, 2, 4-8, and 10-14 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,415,354 to Shutov et al. (referred to as “Shutov” hereinafter). These rejections are respectfully traversed.

In order for a single prior art reference anticipate a claim, the reference must teach each and every element recited in the claim (*see M.P.E.P. § 2131*). Applicant submits that Shutov does not teach each and every element of any of claims 1, 2, 4-8, and 10-14.

As discussed above, independent claim 1 is directed to a powder fabricating apparatus, and recites the following (with emphasis added):

a barrel wherein an inlet and an outlet are formed at both opposite ends thereof, respectively;

a screw which is rotationally mounted in the barrel and by which reactant supplied from the inlet moves toward the outlet;

a driving portion for causing a relative rotational motion between the screw and the barrel;

a reaction control means for controlling reaction conditions of the reactant which moves in the barrel to induce a chemical reaction of the reactant; and

a controller for controlling the driving portion and the reaction control means.

The Action relies on various passages in Shutov for its rejection of independent claim 1. Applicant submits, however, that none of the cited passages nor any other passage in Shutov teach each and every element recited in independent claim 1.

For example, Shutov does not teach at least “a reaction control means for controlling reaction conditions of the reactant which moves in the barrel *to induce a chemical reaction of the reactant.*” Rather, Shutov describes at col. 7, lines 49-66 (as noted in the Action) different portions including a heating zone that is configured to enhance a physical reaction such as pulverization, which has a distinct technical purpose and effect from the recited chemical reaction.

More specifically, as discussed above, a physical reaction typically represents a process in which phase, structure, concentration, pressure, and so forth are changed without any

change of an intrinsic property of the original molecule, ion, or nucleus. Examples of a physical reaction include stirring, *pulverizing*, crushing, mixing, heating, cooling, sieving, distillation, and evaporation. Thus, the pulverization apparatus of Shutov is directed to physical reactions only and not to chemical reactions. For example, Shutov states in the Abstract the focus on “pulverization of natural and synthetic polymeric material by heating to a pre-melt or softening temperature below its melting point, cooling and applying high normal and shear stresses sufficient to form fine powder, and fluidizing the power in a gas stream preventing its agglomeration.”

In contrast, a chemical reaction, such as that induced by the recited reaction control means, typically represents a process in which an intrinsic property of the original material is changed into a different form. Examples of a chemical reaction include redox (reduction/oxidation), combustion, nuclear fission, nuclear fusion, and metabolism.

Therefore, because Shutov does not teach each and every element recited in independent claim 1, the 35 U.S.C. § 102(b) rejection of independent claim 1 should be withdrawn.

Dependent claims 2, 4-8, and 10-14 depend directly or indirectly from independent claim 1 and are allowable for at least the reasons presented above with respect to the parent claim 1. Dependent claims 2, 4-8, and 10-14 are also independently patentable.

Accordingly, Applicant submits that the 35 U.S.C. § 102(b) rejections of dependent claims 2, 4-8, and 10-14 should be withdrawn.

Patentability of Claims 3 and 15 over GB ‘781 under 35 U.S.C. § 103(a)

Claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB ‘781. These rejections are respectfully traversed.

Dependent claims 3 and 15 each depend from independent claim 1 and are allowable for at least the reasons presented above with respect to the parent claim 1. Dependent claims 3 and 15 are also independently patentable.

For example, the electron supply device recited in claim 3 is configured to apply electrons into the barrel for reduction of the reactant, wherein the barrel and the screw are used as electrodes. Such an electron supply device is not taught in the cited references, which merely disclose a temperature control means. The Action indicates that an “electron beam heating device” is ordinarily used for heating, but Applicant submits that the recited electron supply device is not a device for heating but for inducing reduction of the reactant.

Furthermore, the electron beam heating device described in the cited references requires high vacuum and a corresponding vacuum chamber as well as an electron beam generator, whereas the recited electron supply device can be operated in ambient pressure.

Accordingly, Applicant submits that the 35 U.S.C. § 103(a) rejections of dependent claims 3 and 15 should be withdrawn.

Patentability of Claims 5, 6, and 11 over GB '781 and Enikolopow under 35 U.S.C. § 103(a)

Claims 5, 6, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB'781, and further in view of U.S. Patent No. 4,607,797 to Enikolopow et al. (referred to as “Enikolopow” hereinafter). These rejections are respectfully traversed.

Dependent claims 5, 6, and 11 each depend from independent claim 1 and are allowable for at least the reasons presented above with respect to the parent claim 1. Dependent claims 5, 6, and 11 are also independently patentable.

Furthermore, Enikolopow fails to cure the deficiencies of GB '781.

Accordingly, Applicant submits that the 35 U.S.C. § 103(a) rejections of dependent claims 5, 6, and 11 should be withdrawn.

Patentability of Claims 12 and 13 over GB '781 and Shutov under 35 U.S.C. § 103(a)

Claims 12 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over GB '781, and further in view of Shutov. These rejections are respectfully traversed.

Dependent claims 12 and 13 each depend from independent claim 1 and are allowable for at least the reasons presented above with respect to the parent claim 1. Dependent claims 12 and 13 are also independently patentable.

Accordingly, Applicant submits that the 35 U.S.C. § 103(a) rejections of dependent claims 12 and 13 should be withdrawn.

Patentability of Claim 9 over Shutov and GB '781 under 35 U.S.C. § 103(a)

Claims 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shutov, and further in view of GB'781. This rejection is respectfully traversed.

Dependent claim 9 depends from independent claim 1 and is allowable for at least the reasons presented above with respect to the parent claim 1. Dependent claim 9 is also independently patentable.

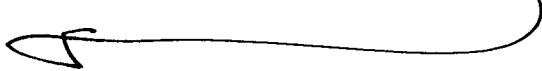
Accordingly, Applicant submits that the 35 U.S.C. § 103(a) rejection of dependent claim 9 should be withdrawn.

Conclusion

For the foregoing reasons, reconsideration and allowance of all of the pending claims in the application as amended is requested. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

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